

~~Reading: YF 5.4~~

~~Sept 29~~

~~Hour One: Experiment 4: Circular Motion~~

~~Reading: Experiment 4~~

~~Hour Two: Test Review~~

~~Sept 30 QUIZ ONE: Fundamental Concepts; Kinematics; Newton's Laws~~

~~7:30 – 9:30 pm~~

~~Oct 1 No class~~

~~Problem Set 4: Due Tues Oct 5 at 4:00 pm.~~

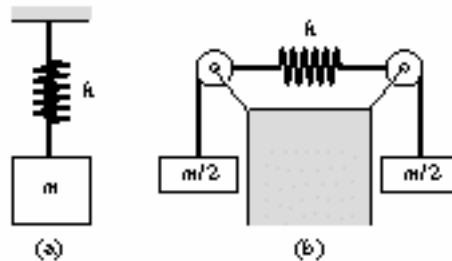
~~Problem 1: (Relative Inertial Frames)~~

~~You and a friend are in an elevator that is rising at constant but unknown velocity v_0 . You are curious to know what speed the elevator is moving. You each happen to be carrying altimeters. You get an idea and drop your keys from a height h above the floor of the elevator. You hold one altimeter at the point where you dropped the keys and your friend places the other one on the floor. You check your altimeter when you release the keys and find the keys are a height d above sea level. Your friend checks the other altimeter when the keys hit the floor and finds the keys are the same height d above sea level. Assume that the gravitational constant is g . You will analyze this problem from two different reference frames. The first reference frame moves with the elevator. The second reference frame is fixed to the ground.~~

- ~~a) As seen from a reference frame moving with elevator, how long does it take for the keys to hit the floor?~~
- ~~b) As seen from a reference frame fixed to the ground, using your result from part a), find an expression for the speed of the elevator in terms of the height h .~~
- ~~c) As seen from a reference frame fixed to the ground, what maximum height above sea level did the keys reach?~~

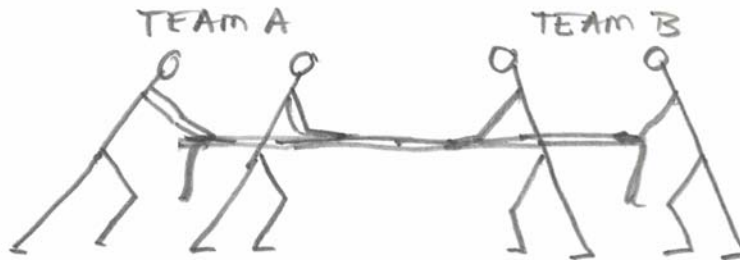
Problem 2 Concept Question: (Hooke's Law)

A body of mass m is suspended from a spring with spring constant k in configuration (a) and the spring is stretched $0.1m$. If two identical bodies of mass $m/2$ are suspended from a spring with the same spring constant k in configuration (b), how much will the spring stretch? Explain your answer.



~~Problem 3: Free Body Diagrams~~

~~Two teams, A and B, are competing in a tug-of-war. Team A is stronger, but neither team is moving because of friction.~~



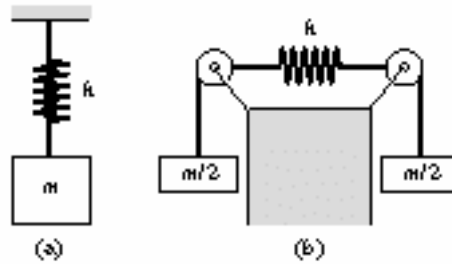
- ~~Draw free body diagrams for team A, for team B, and for the rope.~~
- ~~Both the following statements are true; explain them. Two teams having a tug of war must always pull equally hard on one another. The team that pushes harder against the ground wins.~~

~~Problem 4: Second Law and projectile motion~~

~~An object with mass $m = 2.0\text{ kg}$ slides down a roof a distance 6.0 m on a roof that is inclined at an angle of 3.0×10^1 deg to the horizontal. The roof has a coefficient of kinetic friction $\mu_k = 2.0 \times 10^{-1}$. The edge of the bottom of the roof is at a height $h = 9.0\text{ m}$ above the ground. What is the horizontal displacement from the edge of the roof to the point where the object hits the ground?~~

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Solution

The tension exerted on the string in the second situation is half with respect to the first. The answer is so 5cm.

If you have problems substitute one of the two masses with a fixed hook; does the spring change its length ?